Inelastic X-ray Scattering as a Probe of the Polyamorphic Nature of Materials

Alessandro Cunsolo
National Synchrotron Light Source II, Brookhaven National Laboratory

It will be shown how Inelastic X Ray Scattering can be used as a probe of polyamorphism (PA) phenomena in liquids, in particular considering the case of vitreous GeO_2 from ambient pressure up to pressures well beyond that of the known □-quartz-to-rutile PA transition. As a result, a line-shape analysis of IXS spectra evidenced significant differences in the sound dispersion below and above the PA transition. Furthermore, first-principle lattice dynamics calculations enabled us to interpret these changes as the evolution from a quartz-like to a rutile-like dynamic response. This work highlights for the first time the fingerprint of a PA phenomenon on the high-frequency sound dispersion.